DOCUMENT RESUME

ED 062 024 PS 005 634

AUTHOR Bertram, Charles L.; And Others
TITLE Summative Evaluation of the Appalachia Preschool Education Program.
INSTITUTION Appalachia Educational Lab., Charleston, W. Va.
BUREAU NO BR-6-2909
PUB DATE Dec 71
NOTE 50p.; Summary report

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Cognitive Objectives; *Comparative Analysis; *Early Childhood Education; Educational Finance; *Educational Programs; Educational Television; Field Studies; Home Visits; Individual Development; Interpersonal Competence; Kindergarten Children; Language Development; Mobile Classrooms; Preschool Children; *Preschool Education; *Program Evaluation; Psychomotor Skills; Task Performance; Testing; Test Results
IDENTIFIERS *Appalachia Preschool Education Program

ABSTRACT

A report of the findings from the three-year field test of the Appalachia Preschool Education Program (APEP), an early childhood education program, is presented. The report describes the human and fiscal effort required to operate the program and the changes in the performances of children resulting from the use of the program. It also contains a description of the target population for the program. Findings include: (1) Scores on a test of cognitive objectives favored children who received the Appalachia Preschool Education Program; (2) A trend toward increased language development was observed for APEP children as opposed to children comparison groups; (3) Children who participated in the program scored significantly higher than comparison groups in psychomotor skills; (4) Children who participated in the mobile classroom activities gave indications of having developed more constructive social skills than children who received only the home visitor and television program; and (5) Children in the program reached significantly more cognitive objectives than children who received no treatment. (Author/CK)

ED 062024

BR-6-2909
PS

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

# Summative Evaluation of the Appalachia Preschool Education Program

—Summary Report—

An Early Childhood Education Program Developed by the Appalachia Educational Laboratory

December, 1971

PS 005634

1

Division of Research and Evaluation
Appalachia Educational Laboratory, Inc.
Box 1348
Charleston, W.Va. 25325

by

Charles L. Bertram, Director
Research and Evaluation

Brainard W. Hines, Associate Educational Development Specialist
Research and Evaluation

Randolph MacDonald, Associate Educational Development Specialist
Research and Evaluation

Published by the Appalachia Educational Laboratory, Inc. (1031 Quarrier Street, Charleston, W.Va. 25325), pursuant to a contract with the Department of Health, Education, and Welfare, Office of Education. The views expressed in this document are not necessarily those of the Office of Education.

# Foreword

The Appalachia Educational Laboratory defines educational development as the systematic process of creating and diffusing alternative products that will contribute to the improvement of educational practices. The Appalachia Preschool Education Program has been developed by the Laboratory as an alternative to other forms of preschool education, and summative evaluation was conducted to indicate possible behavior changes and cost efficiency through use of the product.

This Summative Evaluation Report is based on three years of field testing in southern West Virginia, from 1968 through 1971. The report contains a summary section of conclusions concerning the performance of children who participated in the Appalachia Preschool Education Program as well as resources required for operating the program. The summary section is based on a series of 10 technical reports which give a statistical background for the conclusions stated in the summary report. All technical reports are available from the Laboratory, and they, along with the summary section, may be found in the Educational Resources Information Center (ERIC) microfiche system. In order to reduce bias regarding the evaluation of a product, the summative evaluation activities at AEL are the responsibility of a staff division separate from the program staff.

The Laboratory is grateful for the consultative support provided to the summative evaluation throughout the three years of field testing. Acknowledgment is especially extended to Dr. Frank Hooper of the University of Wisconsin, Dr. John Kennedy of the Ohio State University, Dr. Charles Kenoyer of West Virginia University, and Dr. Ray Norris of George Peabody College. Dr. James Ranson of the West Virginia University Kanawha Valley Graduate Center was Director of Research and Evaluation during the first field test year, and Dr. Roy Alford was Director of the Appalachia Preschool Education Program during the three years of field testing. Dr. John Seyfarth of the West Virginia Kanawha Valley Graduate Center assisted with preparation of the reports for publication.

Benjamin E. Carmichael, Director
Appalachia Educational Laboratory, Inc.

# Table of Contents

Chapter 1

SUMMATIVE EVALUATION OF THE APPALACHIA PRESCHOOL EDUCATION PROGRAM ..... 1
Introduction ..... 1
The Program ..... 1
The Plan for Evaluation ..... 2
Program Effort ..... 3
Acquisition and Installation of Equipment and Facilities ..... 4
Operational Requirements ..... 4
Maintenance ..... 9
Program Cost Analysis ..... 9
Program Performance ..... 11
Program Performance Pervasiveness ..... 27
Description of West Virginia Population ..... 27
Children of Ages 3, 4, and 5. ..... 27
Evaluation Synthesis ..... 28
Cognition ..... 28
Language ..... 28
Psychomotor ..... 29
Social Skills ..... 29
Interest ..... 29
Kindergarten Comparison ..... 29
Required Effort for 25,000 Children ..... 30

REFERENCES ..... 31

# List of Tables

Table

1 Acquisition and Installation of Equipment and Facilities ..... 5

2 Projected Cost of the Appalachia Preschool Education Program for 25,000 Children for One Year ..... 6

3 Number of Children in Treatment Groups by Age ..... 14

4 Mean Hollingshead Socioeconomic Scores by Treatment Group ..... 14

Table

5 Mean Post-test Scores and Levels of Significance for the Appalachia Preschool Test by Treatment Group ..... 16

6 Mean Post-test Scores and Levels of Significance for the Illinois Test of Psycholinguistic Abilities by Treatment Group ..... 19

7 Mean Post-test Scores and Levels of Significance for the Frostig Test by Treatment Group ..... 20

8 Mean Post-test Scores and Levels of Significance for the Appalachia Preschool Test and PPVT IQ by Treatment Group and Including Kindergarten Sample ..... 25

9 Summary of Contributions to Children's Performance of Instructional Television Program, Home Visitor, and Mobile Classroom ..... 26

List of Attachments

Attachment

1 List of Available and Proposed Publications Pertaining to the Appalachia Preschool Education Program ..... 33

2 Abstract of AEL Educational Development Model ..... 39

# 1970-71 Technical Reports Pertaining To Appalachia Preschool Education Program

| Report Number | |
|---|---|
| 11 | Demographic and Socioeconomic Data of the Beckley, W.Va., Area and 1968-1971 Development Costs of AEL's Preschool Education Field Study |
| 13 | Analysis of Intelligence Scores |
| 14 | Attainment of Cognitive Objectives |
| 15 | Detailed Analysis of the Language Development of Children in AEL's Preschool Education Program |
| 16 | Analysis of Visual Perception of Children in the Appalachia Preschool Education Program |
| 17 | Factor Analysis of the Appalachia Preschool Education Program Test Data |
| 18 | Analysis of Social Skills Development in the Appalachia Preschool Education Program |
| 21 | A Comparison of Parents' Attitudes Toward AEL's Around the Bend and Other Children's Television Programs |
| 22 | Measuring Children's Curiosity |
| 23 | A Comparison of AEL's Preschool Education Program with Standard Kindergarten Programs |

# Summative Evaluation of the Appalachia Preschool Education Program

## Introduction

This is a report of the findings from the three-year field test of the Appalachia Preschool Education Program, an early childhood education program which has been developed by the Appalachia Educational Laboratory, Inc. The report describes the human and fiscal effort required to operate the Appalachia Preschool Education Program (APEP) and the changes in the performances of children resulting from use of the program. The report also contains a description of the target population for the program. The major findings of the three years of field testing are summarized on pages 28 through 30 of this report.

Immediately following is a brief description of AEL's Appalachia Preschool Education Program and the plan which was used for evaluating the program.

### The Program

The Appalachia Preschool Education Program is a home-oriented instructional system designed for 3-, 4-, and 5-year-old children. It consists of 30-minute television lessons broadcast into the home each day; a weekly home visit by a paraprofessional who discusses the program with parents and children and who delivers materials used by them; and group instruction provided once each week in a mobile classroom taken near the home for convenience to parents and small children.

The program is based on behavioral objectives which were developed by West Virginia University (Hooper and Marshall, 1968, p. 97-197) from a nationwide study of preschool education programs and an assessment of preschool Appalachian children. A materials development team was employed to

translate those objectives into television lessons, materials for home use by parents and children, and materials and exercises for use in group instruction in the mobile classroom.

The television lessons, recorded on videotape, were produced in Charleston, W.Va. They were sent to Oak Hill, W.Va., where they were broadcast by a commercial television station over an eight-county area of southern West Virginia. The home visitation and mobile classroom components of the program operated out of the field test headquarters at Beckley, W.Va. Eight paraprofessionals were employed and trained to perform home visitation services, and one regularly certified teacher and an aide were employed to operate and furnish mobile classroom instruction. The fully equipped 8' x 22' classroom was mounted on a two and one-half ton truck chassis. Power for the operation of the heating and cooling system and all electronic equipment in the classroom was provided through metered outlets mounted on poles at each scheduled stop of the classroom.

The Laboratory has produced several publications which give a more complete description of the Appalachia Preschool Education Program. A series of guides to parallel this summative evaluation report will give comprehensive descriptions of the different components of the program and detailed specifications for establishing the program. These guides will be available by June 1, 1972. Attachment 1 contains a list of available and proposed Laboratory publications which describe various aspects of the program.

**The Plan for Evaluation**

Summative evaluation is considered to be an integral part of educational development at the Appalachia Educational Laboratory. The Laboratory's Model for Educational Development is presented as Attachment 2 to the summary report. The model includes stages which permit an educational product to be taken from an initial Needs Assessment through Feasibility Analysis and Program Planning to the Design and Engineering stage. The product in this case is the Appalachia Preschool Education Program which is now completing the fifth, or Field Testing, stage. Following Field Testing is a stage called Operational Testing during which the Laboratory exercises fewer controls; at that time, the product, if found successful, is disseminated to and implemented by the target population.

Summative evaluation is of primary importance during the Field Testing stage since future use of the product by both the Laboratory and the target population is dependent on evidence that the product has met objectives established during the Design and Engineering stage.

The Appalachia Preschool Education Program was field tested for three years (1968-1971), during which data were collected for the purpose of summative evaluation. An evaluation report was produced at the end of each of the

first two years (see Attachment 2). In practice, the decision to enter the Operational Testing stage with the program was based in part on a rather positive evaluation following the second year of field testing.

The plan for summative evaluation of the program was to collect, analyze, and report data which would indicate: the effort required to produce an Appalachia Preschool Education Program, the performance of individuals who received the program, and the characteristics of the population which is expected to receive the program. The required effort is based on records of personnel employed, materials used, and expenses incurred.

The statements about the performance of individuals who received the program are based on standardized test data, data from measures of the achievement of specific objectives, attitudinal and interest measures, and socioeconomic data. The specific measures and the frequency with which they were taken are described under the section of the report entitled Program Performance. A description of the population to be served by the program is given under the section entitled Program Pervasiveness, and the findings of this summary evaluation report are further summarized in the section entitled Evaluation Synthesis.

The field test results are presented by four major categories in order to facilitate educational decision-making as suggested by Stufflebeam (1971). The Program Effort and Program Pervasiveness sections of the report, although based on data from approximately 600 children in the Beckley field test, are presented in terms of a population unit of 25,000 children. The Appalachia Preschool Education Program was designed as a regional program and cannot be feasibly produced and operated for two or three hundred children. For example, the total operational cost for preparing the materials and video-tapes totaled $204,410, and the amount would vary only slightly according to the number of children who watched the tapes and used the materials. This cost would be unreasonable if prorated over a few hundred children, but would average only $8.18 per child if the APEP were used for 25,000 children on a regional basis. Other costs, such as that for paraprofessional home visitors, vary directly with the number of children served regardless of the scale of operation.

## Program Effort

Program effort is defined operationally as time, personnel, and money required to acquire, install, operate and maintain an operational Appalachia Preschool Education Program serving 25,000 children. Program effort is categorized by four major functions: acquisition and installation of facilities and equipment, operational requirements for the field test, equipment and facility maintenance requirements, and program cost analysis.

## Acquisition and Installation of Equipment and Facilities

Information pertaining to acquisition and installation of equipment is presented in Table 1. As indicated in the table, most equipment required for the television component of the program was rented. Studio time and office space for the materials team were available in a commercial studio in Charleston, W.Va. Certain technical personnel also were included in the studio package. Office space for the field operation of mobile classroom personnel and home visitors was available in Beckley, W.Va.

Parking spaces for the mobile classroom were secured from churches, schools, and community centers. Power companies installed ten 220-volt meters for operation of the mobile classroom. The coordinator of the field testing operations made arrangements for these facilities. Experience indicated that at least one year of lead time is needed for making these arrangements and preparing for the production of the television lessons. No major legal obstacles were encountered to prevent the installation of the field testing operation.

Special consultants were used in connection with acquisition and installation of some equipment. Some services were required to establish specifications for media requirements, and extensive services were required to develop specifications for the mobile classroom facility.

A publication scheduled for completion by the APEP Development Team by June 1, 1972, will give a more detailed description of the equipment and facilities needed to operate the program (see Attachment 1).

## Operational Requirements

A second section of the evaluation plan pertained to the program effort needed to meet operational requirements, including personnel, time expended by personnel, requirements from other participating agencies, personnel training, and formative evaluation. Formative evaluation was conducted to determine whether program components and specific activities were meeting the objectives for which they were designed on a day-to-day basis. Data recorded on operational requirements for 25,000 children are presented in the first column of Table 2. These estimates are based on data recorded during the three-year field test cycle and are basically the actual costs of developing the program projected onto a population of 25,000 children.

A staff of eight professional personnel with an average salary of $13,820 is suggested for the preparation of materials and TV lessons. The titles of these eight professionals, which would compose a curriculum materials team, might be: Curriculum Materials Coordinator, Production Manager, Curriculum Specialist (2), Graphic Arts Specialist, On-Camera Teacher, Artist-Photographer, and an Instructional Monitor responsible for formative evaluation. Two small and two large broadcast stations are listed

Table 1

Acquisition and Installation of Equipment and Facilities

| Program Component | Equipment and Facilities | Method of Acquisition |
|---|---|---|
| Television | Studio package: Two black and white cameras, film chain and requisite components for control room, lighting, sound and taping. | Rental |
| | Darkroom | Rental |
| | Four 16mm cameras | Purchased |
| | Office and workroom space | Rental |
| | Transmitting station | Rental |
| Home Visitation | Field office | Rented |
| | Automobiles | Personal cars |
| Mobile Classroom | Preschool classroom, 8' x 22', mounted on two and one-half ton International truck chassis. Classroom includes electric heating and air conditioning, carpeted floors, six listening stations, record player, 16mm projector, overhead projector, projection screen, psychedelic lights, hot plate stove, refrigerator, restroom facilities, and storage cabinets. | Purchased |
| | Ten power supply meters | Contracted |
| | Parking locations | Donated |
| | Field Office | Rented |

PS005634

Table 2

Projected Cost of the Appalachia Preschool Education Program
for 25,000 Children for One Year*

| | |
|---|---|
| I. Preparation of Materials and TV Lessons | |
| A. Personnel | |
| 8 professional personnel average $13,820 each | $110,560 |
| 3 support personnel average $5,000 each | 15,000 |
| Staff travel average $550 each | 4,400 |
| Consultants (inc. travel) | 1,500 |
| B. Office and Studio Facilities | |
| Production $100 per hour, 2 hr. per program (170 programs) | 34,000 |
| Equipment repair and maintenance | 750 |
| C. Production Supplies | |
| Videotapes (replacement) (50 tapes @ $75/tape) | 3,750 |
| Movie and still film (inc. processing) | 4,000 |
| Other (set materials, studio art supplies, etc.) | 3,250 |
| D. Broadcast Facilities (2 large and 2 small stations) | |
| Small Stations (2 stations, $30 per broadcast, 170 broadcasts) | 10,200 |
| Large Stations (2 stations, $50 per broadcast, 170 broadcasts) | 17,000 |
| E. Capital Outlay | |
| Equipment | 12,000 |
| Videotapes (340 @ $75) | 25,500 |
| Total cost of preparation of materials and lessons | |
| Operation | 204,410 |
| Per Pupil | 8.18 |
| Capital outlay | 37,500 |
| Per Pupil | 1.50 |

*Based on actual APEP field test costs prorated to 25,000 children except as noted.

(6)

Table 2 (Continued)

| | |
|---|---|
| II. Field Operation** | |
| A. Personnel | |
| Supervisory | |
| 20 supervisory personnel (18 @ $12,000, 2 @ $16,000) | $248,000 |
| 11 support personnel, av. $5,000 | 55,000 |
| Travel ($1,250 each, 20 persons) | 25,000 |
| Field Staff | |
| 167 teachers, av. $9,60[illegible] each*** (one per 150 children for mobile classroom) | 1,603,200 |
| 167 aides, av. $3,500 (for mobile classroom) | 584,500 |
| 667 home visitors, av. $3,500 (one per 37.5 children) | 2,334,500 |
| Travel for home visitors ($600 per H.V., 667 H.V's.) | 400,200 |
| Consultants (pre- and inservice) | |
| $1,500 each office, 9 offices | 13,500 |
| B. Rent, Communications, Utilities | |
| Office rental ($4,600 per year each, 10 offices) | 46,000 |
| Furniture rental ($584 each office, 10 offices) | 5,840 |
| Utilities, custodial ($840 each, 10 offices) | 8,400 |
| Telephone ($608 each office, 10 offices) | 6,080 |
| C. Children's Supplies | |
| Books, modeling clay, etc. ($2,200 per unit of 150 children, 167 units) | 367,400 |

**Based on nine field offices, each responsible for approximately 2,800 children, and one central administrative office.

***Figure based on West Virginia estimated average teacher's salary of $7,458 (Rankings of the Counties, 1970, West Virginia Education Association, April, 1970, p. 14) for 10 months, or $8,950 for 12 months plus an additional $650 for driving the mobile classroom.

(7)

Table 2 (Continued)

| | |
|---|---|
| D. Equipment Repair, Maintenance and Insurance | |
| Repair, Maintenance, gasoline (167 mobile classrooms, $1,400 each) | $233,800 |
| Insurance and Bonds (167 mobile classrooms, $733 each) | 122,411 |
| E. Capital Outlay | |
| Mobile Classrooms (167 units, $16,000 each)**** | 2,672,000 |
| Total field costs | |
| Operation | 6,053,831 |
| Per Pupil | 242.15 |
| Capital outlay | 2,672,000 |
| Per Pupil | 106.88 |
| Total Program Costs (I & II) | |
| Operation | 6,258,241 |
| Per Pupil | 250.33 |
| Capital outlay | 2,709,500 |
| Per Pupil | 108.38 |
| Capital outlay amortized over five years | 541,900 |
| Per Pupil | 21.68 |

****Actual cost of mobile classroom to AEL was $21,000 for one unit.
A reduced cost of $16,000 would be incurred for multiple units.

(8)

under Broadcast Facilities (I-D, Table 2). These stations would enable the TV lessons to be seen over an area about the size of the state of West Virginia.

An estimate based on field test results indicated that 20 supervisory personnel would be needed for the field test operation (II, Table 2). Two professionals would be located in each of nine field offices, and two professionals would be located in one central office. One professional in each office might be generally responsible for curriculum development and the other professional might assume responsibility for the field operation. These field personnel would share responsibility for recruiting teachers and paraprofessionals, preservice and inservice training of personnel, and distribution of materials and instructions. Personnel requirements for 25,000 children also include 167 certified teachers, 167 aides, and 667 paraprofessional home visitors. In addition, consultants would be needed for preservice and inservice training.

These personnel requirements are based on a population unit of 25,000 children, either approximately all the same age or spread equally among ages 3, 4, and 5 years. The configuration of field offices might vary according to geographic spread of the population, but the total personnel requirements and expenses would remain approximately the same.

### Maintenance

The effort required to maintain the equipment and facilities for operation of the program should be of interest to those considering operating an early childhood education program. Equipment associated with the TV lesson production was maintained as a part of the lease with the TV studio where programs were produced and the station where the programs were transmitted. Minor equipment such as movie cameras was maintained by the curriculum materials team photographer.

Mobile classroom facility maintenance was covered by an agreement with the local dealer from which the equipment was purchased. Terms specified that the equipment be made available to the dealer one afternoon per week for the purpose of routine maintenance checks and repair as needed. The dealer also provided an on-call emergency service in case of breakdown. (In the West Virginia program this was a Guardian Maintenance Agreement through Raleigh Motors, the local International dealer.) Maintenance of the media equipment and other specialized equipment in the mobile classroom was the responsibility of the teacher.

### Program Cost Analysis

The cost for the Appalachia Preschool Education Program for a population unit of 25,000 during one year is also given in Table 2. The cost is

based on the actual experience during the three field test years which are further described in Technical Report No. 11. Following is an explanation of the projected cost for 25,000 children.

The average salary of $13,820 for the eight professional personnel on the Curriculum Materials Team (I-A, Table 2) was their average annual salary during 1969-70. The cost of support personnel was judged to be at about the same rate per person as with the Appalachia Preschool Education Program, but staff travel was thought to be somewhat less than for the Curriculum Materials Team since much of the team's travel was due to the developmental nature of the program. The cost of office and studio facilities is considered average for this type of operation, and there is the possibility that at least some color videotapes could be produced at a cost of $100 per hour. Other costs for preparation of materials and TV lessons are based on two years' experience in operating the program. The 340 videotapes listed under Capital Outlay would permit one program tape to be shared by two stations, thereby creating the necessity of transporting program tapes between stations. An additional cost of $25,500 would permit simultaneous broadcasting.

Total operational cost for preparation of materials and television lessons was projected to be $204,410 or $8.18 per child when prorated over 25,000 children. The capital outlay required for preparation of materials and television lessons was projected to be $37,500 or $1.50 per child. Alternative funding arrangements could cause office and studio facilities, certain production supplies, and/or broadcast facilities to be included as capital outlay rather than operational cost. The above cost estimates could vary considerably according to the type of videotapes and materials desired.

The cost for field operation (II, Table 2) is presented separately because field operation costs vary more directly with the number of children who are to be served. The 18 field supervisors are estimated to require $12,000 each, and the two central office supervisory personnel are estimated at $16,000 each. Annual travel for these personnel is estimated at $1,250 each, since their duties include supervising teachers and home visitors over an area with approximately 2,800 children. The $9,600 average salary for professional teachers is explained in the footnote to Table 2, and the aides and home visitors are expected to require $3,500 each. Their salaries, as well as other costs listed in Table 2, are based on actual field test expenses. The consultants are to be used for preservice and inservice training of teachers, aides, and home visitors. The $122,411 expenditure for insurance and bonds may be funded through some alternative arrangement. The cost for office and furniture rental may be considered as capital outlay under some funding arrangements. The total operational cost for field operations was projected to be $6,053,831 for 25,000 children or $242.15 per child. The capital outlay for field operations was $2,672,000, the cost of 167 mobile classrooms.

The total projected cost of operation of the Appalachia Preschool Education Program for 25,000 students for one year was $6,258,241 or $250.33 per

child. The total capital outlay for the program for 25,000 children was projected at $2,709,500. If equipment is amortized over a five-year period, the cost per child for capital outlay is $21.68.

A separate study was undertaken to determine the comparative cost of a standard kindergarten program in West Virginia as operated in 1969-70 (Preschool for Appalachia, AEL). Based on statistics provided by the West Virginia Department of Education, the per pupil cost of operation for a full day kindergarten program was $496 (compared to $250.33 for APEP), and the capital outlay costs for a standard kindergarten were found to be more than 7.5 times greater than for the AEL program.

The fact that the Appalachia Preschool Education Program can be produced for about one half the cost of standard kindergarten programs was considered important to the evaluation of the program. If the children participating in the program were found to reach objectives appropriate for 3-, 4-, and 5-year-old children, then the procedures developed by the Laboratory would be most acceptable. The following section examines the degree to which improved performance did result from the program.

## Program Performance

Program performance was operationally defined as learning which occurred in the target population--3-, 4-, and 5-year-old children--as a result of the Appalachia Preschool Education Program, as measured by selected instruments and procedures. Learning was classified into cognition, language, psychomotor, social skills, affective, and interest categories. The first three categories were used for conceptualizing the original behavioral objectives for the program. The social skills and affective categories were added as technology and funds became available.

Measurement of social skills development was first attempted during the 1969-70 field test year, and the procedure was replicated during the final field test year. Due to a lack of established procedures, affective learning by children was only indirectly measured. Data on children's and parents' interest were collected throughout the three-year field test cycle.

The following instruments and methods were employed to measure aspects of performance considered important to the success of the Appalachia Preschool Education Program. Language was defined operationally as responses to the Illinois Test of Psycholinguistic Abilities (ITPA). Cognition was defined operationally as responses to the Peabody Picture Vocabulary Test (PPVT), and responses to the Appalachia Preschool Test, a picture test similar in format to the PPVT and ITPA. Intelligence was included in the category of cognition. Psychomotor development was measured by scores on the Marianne Frostig Developmental Test of Visual Perception, and the social skills achievement of children was measured by a specially designed interaction analysis technique. Interest was defined operationally as responses

to attitude checklists developed by AEL staff and responses reflected in anecdotal records systematically collected during the year.

Three Years of Evaluation. In general, the evaluation of the first field test year failed to show substantial gains for the Appalachia Preschool Education Program (AEL, 1970). Children's and parents' interest was high, but especially the children participating in the mobile classroom activites failed to achieve pronounced cognitive gains.

By the end of the second field test year, the evaluation indicated that gains on all measures were becoming more pronounced, with children who received home visitors and the mobile classroom scoring above their peers who only watched the TV program or received no treatment. However, the children who visited the mobile classroom still failed to show greater gains in the cognitive, language, and psychomotor areas than their counterparts who received only the home visitor and TV program, so the decision was made to increase the children's exposure on the mobile classroom from 1.5 hours per week to two hours per week. Also, because of a resignation, a different mobile classroom teacher was employed beginning with the third field test year. Although the mobile classroom primarily was designed to improve social skills, the combination of increased time, a different teacher, and possibly a cumulative growth only observable in the final year tended to give the children who attended the mobile classroom increased performance in certain language skills. The increase in cognition, language, and psychomotor skills was not considered great enough to warrant the expense of the mobile classroom but, as explained in the following sections, gains in social skills and children's curiosity were attributed to participation in the group activities of the mobile unit.

The following section is a description of the children who participated in the various treatment groups and comparison groups during the third field test year (1970-71) of the Appalachia Preschool Education Program.

Sampling Procedures. The evaluation design used to measure program performance of the Appalachia Preschool Education Program utilized three treatment groups located in Raleigh and Fayette counties in south central West Virginia. The initial sample was selected in 1968 by randomly assigning treatments to 3-, 4-, and 5-year-old children living within randomly selected geographic grids in the rural areas. Additional children were added each year as some of the sample became old enough to enter the public schools. During the third year of testing (September 1970-June 1971), approximately 300 children, aged 3, 4, and 5 were enrolled in the program. The number of boys and girls enrolled was about equal, as were the relative sizes of the three treatment groups.

One of these groups (TV-HV-MC) received visits from the mobile classroom, as well as the paraprofessional home visitor, and watched the

television program Around the Bend. The second of the groups (TV-HV) watched the program and was visited by the paraprofessional, while the third (TV only) received only the television program. The sample sizes for different groups of children are given in Table 3.

In September, 1970, a control group of 60 children was identified in Monongalia and Upshur counties, in north central West Virginia. This sample consisted of equal numbers of boys and girls, who were 3, 4, or 5 years of age as of that month. An additional 60 children were sampled from the same area, and all 120 control group children were tested in June of 1971. This was done to provide a (modified) Solomon four-group experimental design which permitted a check on the effect of repeated testing. Selection and testing of the control samples was done by the West Virginia University Human Resources Research Institute.

Prior to the third year of field testing (1970-71), school personnel in the Beckley, W.Va., field test area requested that achievement of children in kindergarten programs be compared with that of children in the Appalachia Preschool Education Program. Sixty-six children in two public school kindergartens were therefore pre and post-tested during the third field test year.

The control group was selected from an area that was demographically similar to the Beckley area, and the kindergarten group was located in the same area. Pertinent socioeconomic data are presented in Technical Report No. 11, but it should be pointed out here that these individuals closely resemble the overall population of the state in regard to level of income and education.

Mean scores from the Hollingshead Two Factor Index of Social Position in each group are reported in Table 4. The differences in socioeconomic level as measured by the Hollingshead were not statistically significant, and the ordered mean scores, from highest socioeconomic level to lowest level, were control, kindergarten, TV-HV, TV-HV-MC, and TV only. Further description and comparison can be found in Technical Reports No. 11 and 23.

In June, 1970, all children enrolled in the second year's program effort were given the following test battery: Subtests 2 and 3 of the Marianne Frostig Test of Perceptual Development, Subtest 5 of the Illinois Test of Psycholinguistic Ability (ITPA), Part 2 of Appalachia Preschool Test (APT, curriculum specific test), and the Peabody Picture Vocabulary Test (PPVT). These post-test measures for the second year's 3- and 4-year-olds also served as the pretest for the same children as they became 4 and 5 years old and entered into the third year's programming.

Subsequently, it was decided to administer all remaining subtests of the above cited battery in September, 1970, to those children who had not taken them previously. In that month, 3-year-olds just entering the program also received the entire test battery. At the same time a sample of 66 children attending two kindergartens in the program area were tested with the APT and PPVT.

Table 3

Number of Children in Treatment Groups by Age

| Age | TV-HV-MC | TV-HV | TV only | Control | Kindergarten |
|---|---|---|---|---|---|
| 3 | 25 | 34 | 13 | 36 | -- |
| 4 | 39 | 47 | 22 | 34 | -- |
| 5 | 31 | 49 | 31 | 33 | 66 |
| Total | 95 | 130 | 66 | 103 | 66 |

Table 4

Mean Hollingshead Socioeconomic Scores by Treatment Group*

| TV-HV-MC | TV-HV | TV only | Control | Kindergarten |
|---|---|---|---|---|
| 3.74 | 3.70 | 4.07 | 3.49 | 3.64 |

*Higher scores indicate lower socioeconomic levels. The first four groups include data from 3-, 4-, and 5-year-old children, and the kindergarten group was composed of only 5-year-olds.

Due to these three-month fluctuations in pre to post-test interval, pre to post-test intervals for 4- and 5-year-olds in the three APEP groups are one year for the following: PPVT Raw Score, IQ, and MA, ITPA 5, Frostig 2, and Frostig 3. Other subtests (i.e., ITPA 1-4 and 6-10, Frostig 1, 4, and 5, and APT 5 and 6) for the 4- and 5-year-olds represent intervals of nine months. All pre to post-test intervals for 3-year-olds in all treatment groups, all ages of the control group, and for the kindergarten group represent elapsed time from September, 1970, until June, 1971, a period of nine months. The testing during the second and third field test years was completed by testers trained by the staff of AEL's Division of Research and Evaluation, and it is strongly suggested that home visitors not do the testing because they know and are known by the children.

The following section of this summary report describes changes in performance observed by those participating in the Appalachia Preschool Education Program. The categories under which the effects of the AEL program will be described are: cognitive growth, language development, psychomotor, and combination of test results. These will be followed by: social skills development, parental interest in television programs, and comparison with kindergarten programs.

Cognitive Growth. Cognition was defined as the ability of a child to recognize numbers and symbols correctly and to make associations. During the first year of the program (1968-69), the Appalachia Preschool Test (APT) was designed to measure the cognitive objectives of the APEP. Additional objectives were emphasized during the second and third years of the field test, and representative items were added to the APT.

As the test was revised, certain subtests or parts were deleted and others added. The subtests used during the final year of field testing were Parts 1, 2, 5, and 6. Part 1 was an 11-item interview, and Parts 2 and 6 were each 61-item subtests which sampled program objectives taught toward during the three years of field testing. Part 5 of the APT contained 18 items measuring logical reasoning, sensory discrimination and labeling, and letter recognition.

The items on the different subtests were taken from program objectives, which were in turn taken from objectives derived from a study of Appalachian preschool children as well as an examination of preschool intervention programs available at that time (Hooper and Marshall, 1968). The results obtained from these subtests were, therefore, considered most important to the evaluation of program success.

As indicated in Table 5, all subtests of the curriculum specific measure (APT) administered near the conclusion of the three-year field test showed significant treatment effects favoring groups of children who viewed the television program and were routinely visited by paraprofessionals. Although the order of means reported in Table 5 from highest to lowest is generally TV-HV-MC, TV-HV, TV only, and control, the paraprofessional home visitor

Table 5

Mean Post-test Scores and Levels of Significance
for the Appalachia Preschool Test
by Treatment Group*

| Subtest | TV-HV-MC | TV-HV | TV only | Control | Significance** |
|---|---|---|---|---|---|
| 1 | 8.2 | 8.1 | 7.6 | 7.6 | <.001 |
| 2 | 40.7 | 38.6 | 35.3 | 29.9 | <.005 |
| 5 | 13.2 | 13.3 | 11.4 | 8.6 | <.005 |
| 6 | 42.8 | 41.4 | 34.4 | 29.0 | <.005 |

**Levels of significance for this and following tables are from analyses of covariance, which, along with tests used to determine significance of differences between means, are found in the respective technical reports.

appeared to be associated with most of the gains in cognitive objectives. The addition of the mobile classroom did not substantially increase the number of cognitive objectives achieved by the children. The conclusion based on analysis of APT data was that the television program provides the basic information for the children, while the home visitors working with the parents and children effectively reinforce the program's cognitive objectives. A description of the APT analyses and results is included as Technical Report No. 14.

The Peabody Picture Vocabulary Test (PPVT) was administered to all children. The PPVT post-test raw scores, along with age in months, were used as covariates in order to permit partial adjusting of certain subtest means according to differences in age and intelligence in the different treatment groups. The mean measured IQ's for different treatment groups ranged from 104 in the TV-HV-MC group to 97 in the TV only group; therefore, the small covariance adjustment would be downward for the TV-HV-MC group and upward for the TV only group. Further explanation is reported in Technical Report No. 13.

Language Development. A second category of objectives for the Appalachia Preschool Education Program was language development. Language was defined operationally as responses to the Illinois Test of Psycholinguistic Abilities (ITPA); the use of this instrument permitted comparisons with national norms. A brief description of each of the 10 subtests is given in Table 6, and more comprehensive descriptions can be found in Technical Report No. 15.

The results from the analysis of ITPA data were about the same as those from the second field test year, and that was only moderately positive for the APEP. The order of differences in means was, in most cases, favorable to APEP, but the results from only three of ten subtests were significant.[1]

Participation on the mobile classroom contributed to the difference in ability to describe objects verbally indicated by Subtest 5 results. All groups except the TV only scored near or above national norms on all ITPA subtests except Subtest 5, and all groups were below national norms on this subtest which measures expressive language ability. Since participation in the activities of the mobile classroom tended to improve children's scores on this subtest, it appears plausible that the mobile classroom is meeting a real need among Appalachian children.

---

[1]As indicated in Technical Report No. 15, an analysis of variance of the ITPA data indicated significant differences ($p<.05$) across treatment groups on all subtests and the total, and the pattern of differences was the same as those presented in Table 6. The covariates were apparently masking treatment differences in the analysis of covariance reported in Table 6.

Psychomotor. The Marianne Frostig Test of Visual Perception was used to measure development in the areas of motor coordination and perceptual learning tasks. As shown in Table 7, the groups which received the Appalachia Preschool Education Program achieved significantly higher scores than the control group on four of the five subtests of the Frostig, as well as the total score. The proper names of the subtests on which the APEP groups achieved higher scores were (1) Eye-Motor Coordination, (3) Constancy of Shape, (4) Position in Space, and (5) Spatial Relationships. The differences on one subtest, Figure-Ground (2), were not statistically significant.

The pattern of results from the analyses of Frostig scores indicates that the television program was having a major effect on eye-motor coordination, the ability to recognize shape constancy, and the ability to conserve patterns after spatial rotations. The paraprofessional intervention was associated with learning in the area of same-different discrimination in terms of spatial rotation. In general, the results indicated that the television program was having a broad effect on children's perceptual motor development, and that the use of the mobile classroom did little to improve children's performance in the areas measured by the Frostig.

The analyses of the Frostig data indicated that the AEL program was having a positive effect on the motor coordination and perceptual learning ability of Appalachian children, and this effect most likely was due to the emphasis on artistic and graphic activities which occurred throughout the program. Further details of the Frostig analyses are given in Technical Report No. 16.

Combination of Test Results. A factor analysis was performed with the 20 subtests of the APT, PPVT, ITPA, and Frostig entered as variables. The purpose was to find whether the test scores would group into a combination which would have special meaning or identity and whether certain treatment groups would achieve higher factor scores than other groups.

As reported in Technical Report No. 17, most of the variance in the 20 subtests was explained by three factors. The first factor contained most of the ITPA subtests along with the PPVT Raw Score and was therefore given the label "visual identification." An analysis of variance of factor scores indicated that there was no significant differences among the treatment group on this factor.

The second factor was composed primarily of the Frostig subtests along with ITPA Subtest 8 and was called "psychomotor." The differences in mean factor scores were significant ($p<.005$) for this factor, and the sequence of means from highest to lowest was TV-HV, TV-HV-MC, TV only, and control, with the first two treatment groups having almost identical mean factor scores.

(18)

Table 6

Mean Post-test Scores and Levels of Significance for the Illinois Test of Psycholinguistic Abilities by Treatment Group

| Subtest | Description | TV-HV-MC | TV-HV | TV only | Control | Significance |
|---|---|---|---|---|---|---|
| 1 | Vocabulary and hearing level | 22.7 | 21.9 | 19.5 | 18.8 | - |
| 2 | Ability to match from a sample | 16.0 | 14.7 | 13.9 | 14.0 | - |
| 3 | Vocabulary auditory association | 18.0 | 16.8 | 16.0 | 14.3 | - |
| 4 | Association and good stimuli | 16.7 | 16.1 | 15.5 | 13.9 | - |
| 5 | Ability to describe objects verbally | 15.0 | 13.2 | 12.2 | 14.1 | <.01 |
| 6 | Vocabulary and ability to communicate gestures | 23.8 | 21.8 | 23.1 | 18.8 | <.05 |
| 7 | Ability to make grammatical transformations | 14.5 | 16.4 | 13.3 | 13.3 | - |
| 8 | Figure ground discrimination | 16.7 | 12.6 | 14.2 | 13.6 | - |
| 9 | Auditory recall | 19.4 | 16.2 | 18.2 | 16.8 | - |
| 10 | Visual recall | 10.9 | 9.6 | 12.4 | 10.1 | <.01 |
| | Total (all subtests) | 173.4 | 163.7 | 158.4 | 147.6 | - |

(19)

Table 7

Mean Post-test Scores and Levels of Significance
for the Frostig Test by Treatment Group

| Subtest | Description | TV-HV-MC | TV-HV | TV only | Control | Significance |
|---|---|---|---|---|---|---|
| 1 | Hand-eye coordination in line drawing | 9.4 | 8.5 | 9.6 | 7.2 | <.01 |
| 2 | Figure ground discrimination | 10.1 | 11.0 | 10.0 | 8.6 | - |
| 3 | Recognition of geometric shapes | 6.9 | 6.0 | 5.3 | 3.8 | <.005 |
| 4 | Discrimination of figure rotation | 4.2 | 4.5 | 3.4 | 2.7 | <.05 |
| 5 | Analysis and reproduction of simple patterns | 2.7 | 2.4 | 1.8 | 1.4 | <.005 |
| Total Score (all subtests) | | 33.2 | 31.8 | 29.8 | 23.8 | <.01 |

(20)

The third factor was made up of the APT subtests and partly by four other subtests and was called "vocabulary." The mean factor scores for treatment groups also were significantly different ($p<.001$), and the order of means from highest to lowest was TV-HV-MC, TV-HV, TV only, and control.

The results of the factor analysis followed precisely the same pattern as the previously reported analysis of the separate tests. There were few differences on the language test, substantial differences on the psychomotor, with the TV-HV-MC and TV-HV groups achieving more cognitive objectives than the TV only or control groups. The results of the factor analysis therefore were considered a validation of the separate tests and established the fact that the different test batteries were measuring different areas of performance of the children.

Social Skills. A preliminary attempt was made during the 1969-70 school year to measure social skills acquired by children in the TV-HV-MC group and in the TV-HV group. The measure of social skills development was replicated during the third field test year (1970-71), and the TV only group of children was added to the comparison.

One of the original purposes for introducing the mobile classroom was that children would learn certain social skills, such as asking questions, responding to peers, and initiating statements. It was hypothesized that exposure to the mobile classroom (TV-HV-MC) would result in the development of social skills important to learning, in addition to the cognitive skills acquired by those children exposed only to the television program and home visitation by paraprofessionals (TV-HV).

The analysis of social skills among preschool children consisted of a systematic observation of interactions among groups of children and was considered an innovative evaluation technique based on interaction analysis procedures. Therefore, the method of observation as well as the results of the analysis was under study. The group receiving the mobile classroom (TV-HV-MC) did possess measurably greater social skills development at the end of the second field test year; however, the task itself did not produce the desired discrimination among individual children that was needed for an efficient comparison. Since actual treatment differences possibly were being masked by a task that failed to discriminate, a task was selected during the third field test year which hopefully required more group participation from all individuals. The task selected for the third field test year was directing a battery operated train on plastic tracks and erecting trees, buildings, animals, and people on a plastic mat. The second task did not appear to discriminate better than the first, but observed differences again indicated that children who participated on the mobile classroom possessed more constructive social skills.

The design for the third year's measurement called for 36 randomly selected children from each of three treatment groups. Data were collected

on 31 TV-HV-MC children, 26 TV-HV children, and 31 TV only children, for a total sample of 88. There were about equal numbers of males and females, and of 3-, 4-, and 5-year-olds. Data concerning the children's interactions were systematically coded using prearranged categories from videotapes of groups of from two to four children manipulating the train and other equipment. The data were analyzed through standard interaction analysis techniques.

The analyses from the third field test year indicated that the TV-HV-MC children initiated more constructive statements than the TV-HV children, who in turn initiated more constructive statements than the TV only children. The TV-HV-MC group showed more enthusiasm, had the least inclination to withdraw from the task or to become distracted. The TV-HV children (no mobile classroom) were least inclined to stop working but in apparent contradiction were most likely to become distracted. One explanation was that children might stop working for reasons other than distraction. The TV only children tended to withdraw from the group, either to work alone and/or for security.

The TV only children tended to meet antagonism with antagonism and often initiated antagonistic behavior. The TV-HV children appeared to be more helpful than the TV-HV-MC children.

The general pattern of differences, from greatest to least social skills development, was TV-HV-MC, TV-HV, TV only. The home visitor appeared to be of some effect in developing social skills and participation on the mobile classroom of more effect. The exceptions were that the TV-HV children were least inclined to stop working and appeared to be more helpful.

The details of the procedures and analyses and a more complete description of the results are given in Technical Report No. 7 for the second field test year and in Technical Report No. 18 for the third field test year.

In conjunction with the social skills measure, a situation was arranged so that a measure of children's curiosity could be taken. A small room was furnished with familiar children's toys such as dolls and balls along with an unusual device which the children could manipulate to produce varied lighting and sound effects. Turning different knobs on the device caused lights to flicker or dim and produced unusual noises. A random sample of 81 children from the APEP treatment groups were introduced to the room one at a time with a parent. The interaction of the child with different objects was coded each three seconds for 15 minutes, and the percent of time spent with the unfamiliar device was considered a measure of the child's curiosity or urge to learn.

The children who had visited the mobile classroom in addition to other treatments (TV-HV-MC) were found to spend a greater percentage of their time ($p<.001$) interacting with the unfamiliar device than children who received only the home visitor and the instructional television program (TV-HV). Also, children who were visited by the paraprofessional each week in addition

to watching the television program (TV-HV) spent significantly more time with the unfamiliar device than children who only had access to the television program (TV only). The boys also were found to spend more time with the device than girls ($p<.001$).

In other words, the home visitations were associated with intellectual curiosity or urge to learn, and attendance on a mobile classroom was associated with an additional degree of curiosity. The procedures and analyses are discussed in Technical Report No. 22.

Parental Interest in Television Programs. A survey was conducted to measure parental response toward the following children's television programs: Misterogers, Captain Kangaroo, Romper Room, AEL's Around the Bend, and Sesame Street. The parents were asked to rate the programs according to those they liked best and least and indicate if their children watched the programs, enjoyed the programs, or learned from the programs, and whether they thought the programs were good for their children. The parents also were asked if they watched the programs with their children.

The forms were mailed to a random sample of 300 parents whose children received different combinations of the APEP television program, home visitation, and mobile classroom experience; 210 replies were received, for a 70 percent return rate.

Parents of children in AEL's program rated the noncommercial black-and-white instructional television program produced by AEL as good as or better than other children's commercial television programs. The highest rating was given to Around the Bend by every group of parents and by 47 percent of all the parents responding. Sesame Street was second with 27 percent, followed by Captain Kangaroo with 22 percent, Misterogers with two percent, and Romper Room with one percent of the first place ratings.

Eighty-nine percent of the parents reported that their children watched Around the Bend three or more times a week, and 80 percent of the parents reported watching the program with their children. Ninety percent of the parents thought their children learned from Around the Bend and encouraged their children to watch the program.

The parents reported that the children watched the instruction television programs, that they themselves watched the programs, that both they and the children enjoyed the programs, and that they thought their children learned from watching the programs. These highly positive results were regarded as an indicator of parental support for the APEP approach as well as parental acceptance of instructional television. Technical Report No. 21 is a detailed presentation of these data.

Comparison with Kindergarten Programs. As a result of a suggestion offered during a meeting with school officials in the Beckley, W.Va., field test area, a one-year comparison of the Appalachia Preschool Education Program with a standard kindergarten program was made. The comparison involved 66 children in two kindergartens near the field test area, 111 5-year-old children in the AEL program, and a control group of 34 5-year-old children. Most of the AEL program children had been in the program for three years.

The children were administered the Peabody Picture Vocabulary Test and three sections of the Appalachia Preschool Test (described in Technical Report No. 14). The latter was designed to measure achievement of objectives included in the APEP curriculum. In addition, socioeconomic data were collected from the parents. An analysis of these data (mentioned previously) indicated that there were no significant differences in socioeconomic level among the groups. There were initial differences in IQ, and PPVT post-test raw scores as well as age in months were used to make slight adjustments in the means on other subtests through an analysis of covariance.

The analysis of the Appalachia Preschool Test data is presented in Technical Report No. 23, and Table 8 of this report shows the pattern of differences in achievement. The usual order of scores on the subtests of the Appalachia Preschool Test from highest to lowest was TV-HV-MC, TV-HV, kindergarten, TV only, and control. The preliminary expectation by AEL staff was that the first three groups would score equally on the test of cognitive objectives. However, the TV-HV-MC and TV-HV groups actually scored significantly higher than the kindergarten group on some of the subtests, and at least equally well on all subtests, and higher than the control group on all of the subtests. The children who received only the TV program scored at the level of the control.

The finding that certain APEP groups scored higher on measures of cognitive objectives than the kindergarten group is one of the most important of the evaluation. In a previous section, an analysis of cost data indicated that the AEL program could be operated for about one half the cost of a standard full day kindergarten program, when used by as many as 25,000 children. The cognitive objectives on which the program and the APT were based were derived from a study of previous intervention programs and the characteristics of Appalachian preschool children. If these objectives are appropriate for 5-year-old children, then the APEP is a more cost effective means of attaining them than a standard kindergarten program.

Summary of Performance. The preceding section has examined evidence of changes in children's performance which appear to be associated with different components of the Appalachia Preschool Education Program. Table 9 is a summary of the effects which were most obviously associated with either the instructional television program, the paraprofessional home visitor, or the mobile classroom. Note that the components are not independent and must function as a whole, although certain components tend to be associated with positive changes in performance.

Table 8

Mean Post-test Scores and Levels of Significance for the Appalachia Preschool Test and PPVT IQ by Treatment Group and Including Kindergarten Sample*

| APT Subtest | TV-HV-MC | TV-HV | TV only | Control | Kindergarten | Significance |
|---|---|---|---|---|---|---|
| 2 | 44.6 | 44.4 | 39.0 | 36.8 | 42.0 | <.005 |
| 5 | 15.1 | 16.4 | 13.4 | 11.1 | 12.9 | <.005 |
| 6 | 49.2 | 47.3 | 40.8 | 37.1 | 46.6 | <.005 |
| PPVT I.Q. | 102.9 | 105.0 | 99.8 | 99.5 | 103.8 | <.005 |
| N | 31 | 49 | 31 | 34 | 66 | |

*All children were in the 5-year-old age group.

Table 9

Summary of Contributions to Children's Performance of Instructional Television Program, Home Visitor, and Mobile Classroom

| Instructional Television Program | Paraprofessional Home Visitor | Mobile Classroom |
|---|---|---|
| The television program provides the basic curriculum on which the other components depend. Although it effectively teaches a number of cognitive objectives without further reinforcement, it is most effective in this area when operating in conjunction with the paraprofessional.<br>The television program also significantly aids in perceptual-motor development by encouraging manual tasks such as drawing and cutting.<br>Further effects of the television program are evident in reaching readiness skills such as the ability to recognize geometric shapes and to conserve relational pattern. | The paraprofessional's main function is to reinforce the child's learning from the basic curriculum. This reinforcement is done by working indirectly with the parent, and directly with the child.<br>The effectiveness of the home visitor is evident in increased learning of cognitive objectives from the television program and in broad areas of increased language growth.<br>The paraprofessional also facilitates perceptual development in terms of shape recognition and reading related skills. | The primary function of the mobile facility is the development of the skills necessary for constructive social interaction. It meets the need of rural and isolated children for structured group interaction.<br>Data from the third year's program effort indicates that the van experience effectively teaches children to cooperate on group tasks and facilitates their social development.<br>Additionally, the mobile facility provides a stimulus to the child's curiosity and his overall urge to learn in novel environments.<br>Finally the mobile facility encourages the child to express himself freely in a nonverbal manner and to interact more freely in a group setting. |

## Program Performance Pervasiveness

Program performance pervasiveness is defined as the base for diffusing the Appalachia Preschool Education Program, i.e., the number and kind of individuals who can be affected by operation of the program.

The pervasiveness of a program under development, especially a program such as the Appalachia Preschool Education Program, may be very different when the program is made operational. The program is designed to operate on a regional basis encompassing several school systems. The television lessons broadcast from the Oak Hill station reached homes over an eight-county area of southern West Virginia. For development purposes, however, the mobile classroom and home visitation components were extended only to the number of youngsters required to develop the program and conduct sufficient evaluation of it during the field test years of 1968-1971.

The program is considered to be a unified set of activities comprising television instruction, home visitation, and mobile classroom instruction. It is designed for optimal operation on a regional, statewide, or even multi-state basis. As explained previously, program performance pervasiveness is predicated on a population unit of 25,000 children in West Virginia.

### Description of West Virginia Population

The population of West Virginia was used as a basis for estimation because the state is of adequate size to make the program feasible and because the program was designed for this type of terrain and population. Similar data might be derived for other regions in Appalachia or elsewhere.

On April 1, 1970, the population of West Virginia was 1,744,237 according to the U.S. Census Bureau (Bureau of Census, 1970). The same report showed that West Virginia had suffered a loss of 6.2 percent in population since 1960. The 1970 Census reported that 61 percent of the people in West Virginia were living in rural areas (i.e., communities of 2,500 or less), and that there were on the average 72 persons per square mile in the state.

According to the West Virginia Education Association (1971), 30.6 percent of the adults age 25 and over had completed high school in 1968. The median per capita income in West Virginia in 1970 was $2,610.

### Children of Ages 3, 4, and 5

At the time of this writing, the exact number of children of ages 3, 4, and 5 in the state in 1970 had not been tabulated by the U.S. Census Bureau. However, the number of children of ages 0 through 4 and of ages 5 through 6 had been tabulated, and the following estimates were projected from those tabulations (AEL, 1971). On April 1, 1970 there was an estimated 28,841

3-year-olds, 29,747 4-year-olds, and 30,707 5-year-olds, for a total 3-, 4-, and 5-year-old population of 89,295. Of this number, the children living in rural areas included 17,593 3-year-olds, 18,146 4-year-olds, and 18,731 5-year-olds, or a total of 54,470.

Estimates of the numbers of 3-, 4-, and 5-year-old children by county varied from 3,438 in Kanawha County and 2,652 in McDowell County to 332 in Pendleton County and 228 in Wirt County.

To provide the Preschool Education Program for all the 3-, 4-, and 5-year-old children in the state of West Virginia (89,295) would require about three and one half times the program effort described in the Program Cost Analysis section of this report for 25,000 children. The operational cost of the AEL program for all the 3-, 4-, and 5-year-old children in rural areas in the state would be $13.6 million (54,470 rural children x $250.33 per child). By comparison, a standard kindergarten program would cost approximately $27 million (54,470 children x $496 per child).

The operational cost of the APEP for all 5-year-old children in West Virginia would be $7.7 million (30,707 children x $250.33 per child) compared to $15.2 million for a standard kindergarten program (30,707 children x $496 per child). To provide the APEP for all rural 5-year-old children (18,731) would require less than the unit cost for 25,000 children.

In summary, the program pervasiveness and program cost studies indicate that the Appalachia Preschool Education Program is an economical alternative to other early childhood education programs.

## Evaluation Synthesis

The purpose of the summative evaluation of the Appalachia Preschool Education Program was to provide information from which decisions could be made regarding the viability of the program as an alternative to other procedures for early childhood education. The following statements summarize the results of three years of evaluation, from 1968 to 1971.

### Cognition

Scores on a test of cognitive objectives favored children who received the Appalachia Preschool Education Program. The interaction of the paraprofessional home visitor with parents and children was associated with substantial gains in the number of cognitive objectives achieved.

### Language

A trend toward increased language development was observed for APEP children as opposed to children in comparison groups. APEP children attained

significantly higher scores on measures of the ability to describe objects verbally and to communicate by means of manual expression.

### Psychomotor

Children who participated in the Appalachia Preschool Education Program scored significantly higher than comparison groups on the following traits: hand-eye coordination, recognition of geometric shapes, discrimination of figure rotation, and analysis and reproduction of simple patterns. The APEP children were found to have achieved a significantly higher level of motor coordination and perceptual learning ability than children who did not receive any program. These differences were considered due to the emphasis on artistic and graphic activities throughout the three years of APEP development.

### Social Skills

Children who participated in the mobile classroom activities gave indications of having developed more constructive social skills than children who received only the home visitor and television program, and that group in turn was more socially constructive than children who only watched the television program. The pattern of differences in social skills development also was found on a measure of children's curiosity.

### Interest

A random sample of 210 parents with children in AEL's program rated children's television programs on general appeal. A first place rating was recorded by 47 percent of the parents for AEL's Around the Bend, 27 percent for Sesame Street, 22 percent for Captain Kangaroo, two percent for Misterogers, and one percent for Romper Room. Around the Bend was not in color.

Eighty-nine percent of the parents reported that their children watched Around the Bend three or more times a week, and 80 percent of the parents said they watched the programs with their children. Parents and children were encouraged to watch Around the Bend by home visitors; however, parents of children who were not exposed to either the home visitor or the mobile classroom rated AEL's program as high as those with access to those components.

### Kindergarten Comparison

Children in the AEL program reached significantly more cognitive objectives than children in a kindergarten program in the same area, and both groups scored significantly higher on a test of cognitive objectives than children who received no treatment.

**Required Effort for 25,000 Children**

Eight professional and three support staff would be required for production of curriculum materials including television lessons.

Field personnel requirements include one certified teacher and one aide for each 150 children, and one paraprofessional home visitor for each 37.5 children.

Based on AEL experience during three years of field testing, the program can be delivered to 25,000 children for an operational cost of $250.33 per child. An additional capital outlay cost of $21.68 per child (amortized over five years) would be required.

The cost for operating the APEP is about one half the operational cost of educating a child in a conventional classroom, and the required capital outlay is less than one seventh of the cost for conventional classroom education.

# References


Hooper, Frank H. and William H. Marshall. The Initial Phase of a Preschool Development Project (Charleston, W.Va.: Appalachia Educational Laboratory, Inc., 1968).

"Interpolation of 1971 Census Data to Obtain Number of Three, Four, and Five Year Old Children Living in Rural Areas" (Charleston, W.Va.: Appalachia Educational Laboratory, Inc., 1971).

1970 Census of Population - West Virginia (Advance Report) (Washington, D.C.: Bureau of the Census, 1970).

Ranking of the Counties (Charleston, W.Va.: West Virginia Education Association, April, 1971).

Stufflebeam, Daniel L. et. al. Educational Evaluation and Decision Making (Itasca, Ill.: F. E. Peacock Publishers, Inc., 1971).


(31/32/33

Attachment 1

List of Available and Proposed Publications Pertaining to the Appalachia Preschool Education Program

## Available Evaluation Reports

Evaluation Report: Early Childhood Education Program, 1969 Field Test, Appalachia Educational Laboratory, Inc., Charleston, W.Va., ED 041 626.

Evaluation Report: Early Childhood Education Program, 1969-70 Field Test, Appalachia Educational Laboratory, Inc., Charleston, W.Va., 1971.

Evaluation Report: Early Childhood Education Program, 1969-70 Field Test. Summary Report, ED 052 837.

Demographic and Socio-Economic Data of the Beckley, W.Va., Area and 1968-1970 Developmental Costs of the Early Childhood Education Field Study. Technical Report No. 1, ED 052 832.

Analysis of Intelligence Scores. Technical Report No. 2, ED 052 838.

Attainment of Cognitive Objectives. Technical Report No. 3, ED 052 833.

Detailed Analysis of Language Development of Preschool Children in ECE Program. Technical Report No. 4, ED 052 834.

Analysis of Visual Perception of Children in the Early Childhood Education Program (Results of the Marianne Frostig Developmental Test of Visual Perception). Technical Report No. 5, ED 052 839.

Factor Analysis of the Early Childhood Education Test Data. Technical Report No. 6, ED 052 840.

Social Skills Development in the Early Childhood Education Project. Technical Report No. 7, ED 052 835.

Results of Parent and Student Reaction Questionnaire. Technical Report No. 8, ED 052 836.

Analysis of Children's Reactions to AEL's Preschool Television Program. Technical Report No. 9, ED 052 841.

A Comparison of Parents' Attitudes Toward AEL's Around the Bend and Other Children's Television Programs. Technical Report No. 10, ED 052 842.

Summative Evaluation of the Appalachia Preschool Education Program, Appalachia Educational Laboratory, Inc., Charleston, W.Va., December, 1971.

Demographic and Socioeconomic Data of the Beckley, W.Va., Area and 1968-1971 Development Costs of AEL's Preschool Education Field Study. Technical Report No. 11.

Analysis of Intelligence Scores. Technical Report No. 13.

Attainment of Cognitive Objectives. Technical Report No. 14.

Detailed Analysis of the Language Development of Children in AEL's Preschool Education Program. Technical Report No. 15.

Analysis of Visual Perception of Children in the Appalachia Preschool Education Program. Technical Report. No. 16.

Factor Analysis of the Appalachia Preschool Education Program Test Data. Technical Report No. 17.

Analysis of Social Skills Development in the Appalachia Preschool Education Program. Technical Report No. 18.

A Comparison of Parents' Attitudes Toward AEL's Around the Bend and Other Children's Television Programs. Technical Report No. 21.

Measuring Children's Curiosity. Technical Report No. 22.

A Comparison of AEL's Preschool Education Program with Standard Kindergarten Programs. Technical Report No. 23.

Other Available Publications

Marshall, H. William and Frank H. Hooper, The Initial Phase of a Preschool Curriculum Development Project, (Final Report) Appalachia Educational Laboratory, Charleston, W.Va., August, 1968.

Appalachia Educational Laboratory: Early Childhood Education, Career Decision-Making, Educational Cooperatives, November, 1971. (Brochure)

Alford, Roy, The Appalachia Preschool Education Program: A Home-Oriented Approach. ED 052 865.

Alford, Roy, Teaching Mathematical Concepts to Rural Preschool Children Through a Home-Oriented Program, Doctoral Dissertation, Appalachia Educational Laboratory, Charleston, W.Va., June, 1970.

Proposed Publications for 1972
(not exact titles)

Implementation Guide (a description of the program and directions for beginning implementation).

Materials Preparation Manual (directions for producing videotapes, home use materials, and mobile classroom materials suitable for use in operation of program).

Field Operations Manual (describes training procedures and design for operation field activities).

Home Visitors Handbook (describes materials, methods, and activities and cites further references).

Mobile Classroom Teacher Handbook (describes materials, methods, and activities and cites further references).

Curriculum Guide (a list of suggested behavioral objectives for children enrolled in program).

Personnel Training Guide (specific procedures and activities to be used in preservice and inservice training of field personnel).

Evaluation Manual (suggested procedures and instruments to be used in assessing the effectiveness of the program and providing feedback for program improvement).

---

(37)/38/39

# Attachment 2

# Abstract of AEL Educational Development Model

The Appalachia Educational Laboratory defines educational development as the systematic process of creating and diffusing alternative products that will contribute to the improvement of educational practices. This increases requirements of the process beyond earlier models providing for product development only.

The rationale for this position is that, in most instances, the successful implementation of educational products requires more than the general dissemination of information about the product. To break down the historical educational pattern of teachers and classrooms and children by 25s and to substitute for it a model whose structures and practices are built increasingly on knowledge, whose central concerns are for continuous improvement, and whose basic posture is one of accountability, requires changes in skills, attitudes, and motives of educational practitioners. While AEL firmly supports the position that the only reliable approach to the improvement of these qualities is through the creation and utilization of thoroughly tested educational products, it also holds the belief that there must be substantial involvement by potential users in the planning and development of the products if systematic adoption is to be effected.

Consistent with this rationale, the Laboratory employs a model for educational development consisting of seven stages of work with both functions of product development and product diffusion carried on simultaneously but with differing emphasis at various stages. The model and the interrelationships between product development and product diffusion are shown in Figure 1 of this attachment.

The stages of educational development displayed in Figure 1 are as follows:

Stage 1: Needs Assessment
Stage 2: Feasibility Analysis
Stage 3: Program Planning
Stage 4: Product Design and Engineering
Stage 5: Field Testing
Stage 6: Operational Testing
Stage 7: Dissemination and Implementation

As indicated in Figure 1, the first three stages contain the series of decisions which make up Program Planning Strategy. The importance of the function of diffusion in Program Planning Strategy is illustrated by the fact that to plan a program to develop a product which attempts to solve a problem of no concern to educational practitioners or which cannot be implemented would be a wasted effort.

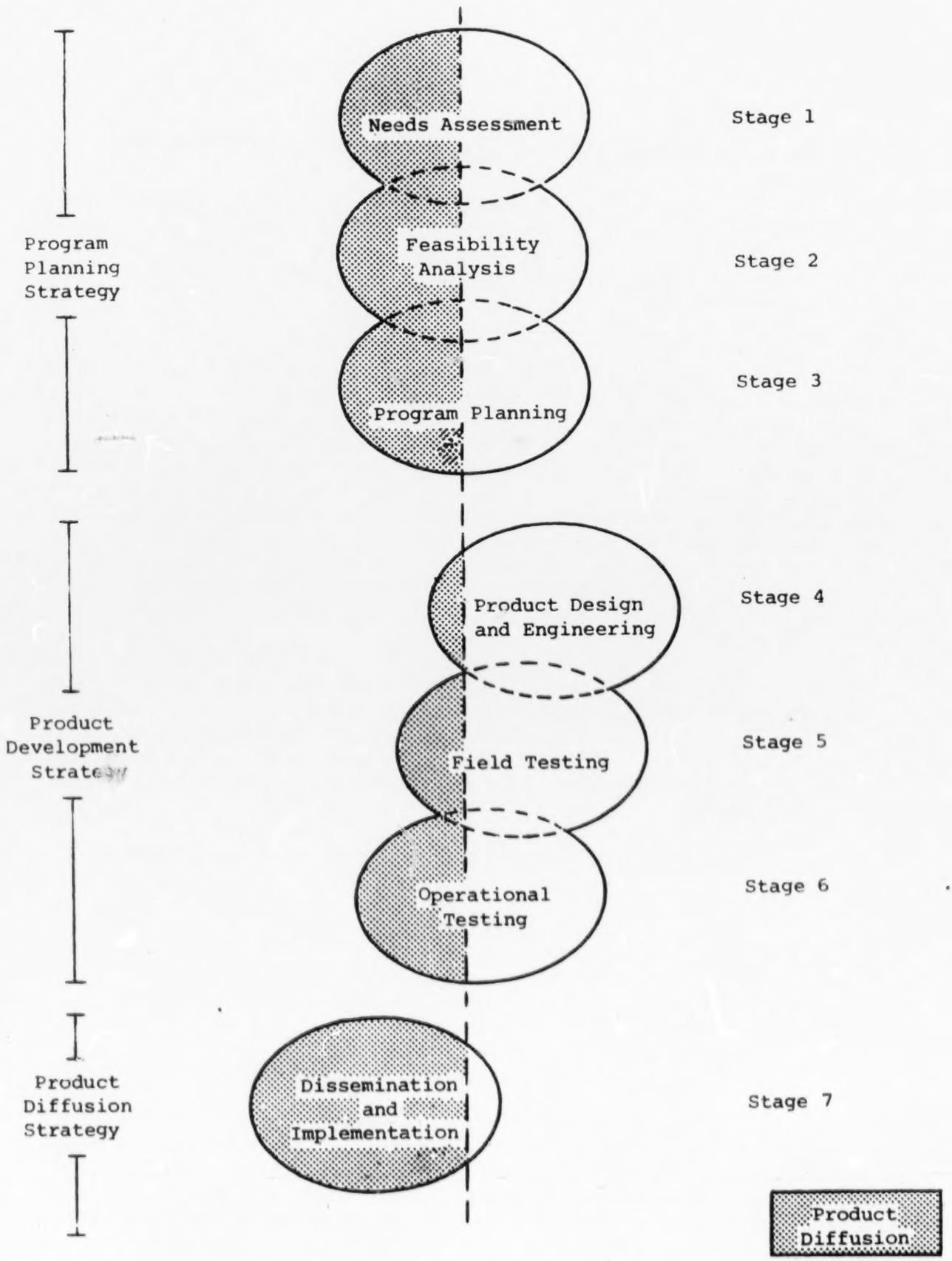


Figure 1

AEL MODEL FOR EDUCATIONAL DEVELOPMENT

The fourth, fifth, and sixth stages contain the decisions which make up the Product Development Strategy. Here the product development function is of more importance than the product diffusion function, but some diffusion activities are required during these stages, particularly in Stage 6.

The seventh stage, Dissemination and Implementation, contains a continuation and culmination of the steps taken to carry completed outputs forward to produce the intended outcomes with the specified target populations and constitutes the Diffusion and Implementation Strategy. Here the product diffusion function is of major importance.

Internal to each stage is a series of activities, outputs, and criteria for advancing to the next stage of work. Any development efforts not meeting the specified advancement criterion in Stages 2 through 6 are recycled until the criteria are satisfied, or alternatively, a decision is made to abort the effort. This recycling process, with resulting improved performance, is fundamental in educational development and is apparent in the statement of activities in each stage of development.

Stage 1: Needs Assessment

The purpose of the needs assessment stage is to determine the priority of educational needs of the region which are appropriate for solution by educational development activities.

Activities: 1) Collection and analysis of regional educational and demographic data; 2) assessment of lay and professional perceptions of regional educational needs; and 3) ranking of educational needs in priority order based upon significance and probability of implementation of solutions.

Outputs: 1) An information base to assist in decision-making relative to appropriate attacks on educational problems; and 2) a priority list of regional educational needs whose solutions can be implemented.

Advancement Criterion: High probability that the priority needs listed correspond to actual needs and can be solved by educational development products.

Stage 2: Feasibility Analysis

The purpose of feasibility analysis is to determine if it is feasible for the Laboratory to plan a development program with objectives to meet a specific educational need.

Activities: 1) Selection of a specific regional need; 2) determination of general outcomes to be achieved by the products of the development program; 3) application of the following feasibility criteria:

a. Are resources available or obtainable to mount the necessary developmental effort?

b. Does the necessary knowledge exist to develop an acceptable (to achieve the general outcomes) solution?

c. Is the program to be developed consistent with the mission of the Laboratory?

d. Is the need of enough importance to make implementation probable?

e. Will the estimated cost of the product not be prohibitive to the consumer?

and 4) determination of the objectives of a program which is to be developed.

Outputs: 1) Evidence of the selected educational need; 2) statement of general outcomes desired as a solution to the need; 3) comprehensive documentation that a program can be successfully developed and implemented by the Laboratory; and 4) a statement of objectives to be achieved by the program to be developed.

Advancement Criterion: High probability that an educational development program to achieve specified objectives could be supported by anticipated Laboratory resources.

Stage 3: Program Planning

The purpose of the program planning stage is to decide upon a specific program and prepare a plan for developing the product.

Activities: 1) Definition of alternative programs with firm estimates of associated costs-to-benefits for target populations; 2) estimation of development costs for each alternative; 3) determination of most appropriate program; 4) preparation of program work plan; and 5) determination of level of acceptability of proposed products through contacts and involvement of regional constituencies.

Outputs: 1) Documentation of cost-benefit ratios for alternative solutions; 2) documentation of estimated development costs for each alternative; 3) documented basic program plan detailing problem to be solved, specific product objectives, product development and diffusion strategies, and work plan with costs by development stages; and 4) documentation of constituencies' receptivity to program.

Advancement Criteria: 1) High probability that the program as planned will achieve the objectives to ameliorate the need; 2) the approval of the Basic Program Plan by the U.S. Office of Education; and 3) evidence that regional constituencies are receptive to the proposed solutions.

Stage 4: Product Design and Engineering

The purpose of the product design and engineering stage is to design, construct, preliminary test, and redesign the product.

Activities: 1) Preparation of specifications for the product; 2) preparation of the design of the product; 3) preparation of procedures and instruments for product evaluation; 4) consultation with and support of regional constituencies regarding features and possibilities of product design; 5) construction of prototype and/or elements in limited, simulated environment; and 6) redesign and reconstruction of prototype to eliminate observable deficiencies.

Outputs: 1) Prototype product; 2) evaluation procedures and instruments; and 3) evidence on consistency of product with potential users' expectations.

Advancement Criteria: 1) Documented high efficiency of product in producing specified outcomes in limited, simulated environment; and 2) evidence that the product is consistent with potential users' needs and capabilities.

Stage 5: Field Testing

The purpose of the field testing stage is to test the product, under Laboratory control, with a sub-set of the target population in a setting approximating a typical educational environment to ascertain whether the product can produce stated outcomes.

(45)

Activities: 1) Identification and establishment of relationships with constituencies for field test site; 2) placement of product in operational mode; 3) testing of product; 4) product revision based upon field test data; and 5) provision of full information on field test to regional constituencies.

Outputs: 1) Documented field test results of the use of the product; and 2) revised product.

Advancement Criteria: 1) Evidence that the product meets specifications and high probability that it will produce specified outcomes in an operational test; and 2) evidence of interest in the product on the part of regional constituencies.

Stage 6: Operational Testing

The purpose of the operational testing stage is to test the product, with a minimum of Laboratory control, in a typical educational environment to ascertain if the product can produce stated outcomes in the target population.

Activities: 1) Identification and establishment of relationships with constituencies for operational test sites; 2) placement of product in operational mode; 3) test of product; 4) product revision based upon operational test data; 5) provision of opportunity for site visits, full information on availability of product to regional constituencies; 6) production of materials dealing with problems unique to implementation; 7) exploration of possible relationships with regional agencies which could serve as linkages in implementation; and 8) exploration of the possibility of marketing through commercial publishers or manufacturers and other means.

Outputs: 1) Documented evidence of the results of the operational test; 2) a revised and tested product; and 3) readiness among regional constituencies for widespread implementation of the product.

Advancement Criteria: 1) Evidence that product objectives are met at an acceptable level; and 2) product in a form to be broadly disseminated and implemented.

Stage 7: Dissemination and Implementation

The purpose of the dissemination and implementation stage is to achieve widespread implementation of the product by capitalizing upon the readiness for adoption by regional constituencies built during earlier stages.

Activities: 1) Completion of agreements for marketing through commercial publishers or manufacturers and other means; 2) activation of institutional linkages to advance implementation; 3) provision for information on necessary supporting systems for implementation; 4) provision of full information on the product and costs to implement to regional constituencies; and 5) maintenance of a record of product adoption and user satisfaction.

Output: Reliable, proven product widely adopted and implemented.

There are wide variations in requirements for resources at different stages of development. Resource requirements are minimal through the first stages; accelerate sharply through the stages concerned with design and engineering, field testing, and operational testing; and then taper sharply during dissemination and implementation.